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FOREST PEST MANAGEMENT

MOUNTAIN PINE BEETLE STATUS REPORT

NORTHERN REGION, 1986

Kenneth E. Gibson

Robert D. Oakes

USDA FOREST SERVICE
NORTHERN REGION

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MOUNTAIN PINE BEETLE STATUS REPORT
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1986

by

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and

Robert D. Oakes

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TABLE OF CONTENTS

	Page
Introduction	1
Beaverhead National Forest	4
Bitterroot National Forest	4
Custer National Forest	4
Deerlodge National Forest	6
Flathead National Forest	6
Gallatin National Forest	6
Helena National Forest	8
Idaho Panhandle National Forests	9
Kootenai National Forest	9
Lewis & Clark National Forest	11
Lolo National Forest	11
Nezperce National Forest	13
Glacier National Park	13
Yellowstone National Park	14
Blackfeet Indian Reservation	14
Crow Indian Reservation	15
Northern Cheyenne Indian Reservation	15
Fort Belknap Indian Reservation	15
Rocky Boy's Indian Reservation	15
Flathead Indian Reservation	15
Stillwater, Swan River, Thompson River State Forests (Montana)	16

Page

Mica, Kendrick, Cataldo, and Clearwater/Potlatch Fire Protection Districts (Idaho)..... 16

Craig Mountains (Idaho)..... 16

References..... 17

Infestation Maps

MOUNTAIN PINE BEETLE STATUS REPORT, NORTHERN REGION, 1986

INTRODUCTION

The series of mountain pine beetle outbreaks, existing in the Northern Region since the mid-1960's (McGregor et al. 1985), continued to cause widespread mortality in all host species in 1986. Though reduced slightly from 1985 levels, approximately 885,000 acres are currently infested. In 1985, that figure had been about 947,000 acres (Tunnock et al. 1986). Many infestations are declining as a result of host depletion and management activities; however, localized infestations on the Bitterroot, Deerlodge, Flathead, Kootenai, and Lolo National Forests (NF), the Northern Cheyenne Indian Reservation (IR), and adjacent State and private lands increased significantly. Though some infestations will undoubtedly intensify over the next few years, Regionwide we anticipate a gradual declining trend in infested acres into 1987.

Tables 1 and 2 show infested acres, derived from aerial survey estimates, for lands under Federal jurisdiction and State and privately owned lands, respectively. Acreage figures are calculated from sketch-map estimates made during annual aerial surveys. Aerial observers are able to detect only "faded" trees, which are those killed the previous year. As valuable as those estimates are, infestation information based on aerial surveys is 1 year old when we receive it. For that reason, we endeavor to gather current-year infestation data through ground surveys to the extent time and available personnel permit. Ground surveys enable us to obtain not only current infestation estimates, but previous-year levels as well. With that we can more accurately determine whether infestations are increasing, decreasing, or remaining static in a particular area. Green-stand data is also collected with which we can better predict potential future losses. All this information is used to gain better perceptions about the vigor of infestations, brood survival rates, and anticipated impacts.

The following report includes aerial and ground survey data for National Forests (including some land of other ownerships) on which beetle infestations currently exist. Tables and maps for both 1985 and 1986 indicate infestation trends. We have not ground surveyed every infestation, nor have we surveyed any as extensively as we may have liked. Therefore, survey data is pertinent only for the areas in which it was collected. Predictions of infestation trend for a certain area are based on observations of infestation intensity and accompanying live-tree data. To the extent characteristics are similar in stands not visited, those predictions may be equally applicable.

Table 1.--Acres under Federal jurisdiction in the Northern Region on which mountain pine beetle-caused mortality was observed, 1985 and 1986

Area	1985				1986			
	LPP[1]	PP	WBP	WWP	LPP	PP	WBP	WWP
Beaverhead NF	4,177	--	--	--	167	--	3	--
Bitterroot NF	799	1,260			2,703	1,679	--	1
Clearwater NF	--	--	--	2	--	--	40	--
Custer NF	1	215	1	--	5	274	150	--
Deerlodge NF	4,963	--	--	--	2,377	--	--	--
Flathead NF	124,950	3,538	2,318	1,547	209,312	62	1,246	1,054
Gallatin NF	[2]	[2]	[2]	[2]	8,835	--	578	--
Helena NF	1,342	211	48	--	2,433	937	--	--
ID Panhandle NF's	41	11	--	710	58	34	23	1
Kootenai NF	363,398	12,326	202	970	336,555	4,710	5	631
Lewis & Clark NF	67	5,825	--	--	112	1,919	--	--
Lolo NF	20,136	1,247	1,114	--	32,012	877	849	39
Nezperce NF	4,282	4,668	--	--	5,643	17	71	--
Total NF	524,156	29,301	3,683	3,229	600,212	10,509	2,965	1,726
Glacier NP	12,412	1	157	58	1,956	--	--	551
Yellowstone NP	6,885	--	44	--	310	--	--	--
Blackfeet IR	4,188	--	10	--	704	--	--	--
Crow IR	--	5,717	--	--	--	5,301	--	--
Flathead IR	1,923	1,825	139	--	1,674	1,743	291	--
Ft. Belknap IR	--	925	--	--	--	405	--	--
N. Cheyenne IR	--	2,836	--	--	--	2,556	--	--
Rocky Boy's IR	[2]	[2]	[2]	[2]	355	593	--	--
BLM (total)	29	2,492	--	--	3,998	1,762	--	--
Total Non-NF	25,437	13,796	350	58	8,997	12,360	291	551
Total Federal	549,593	43,097	4,033	3,287	609,209	22,869	3,256	2,277

[1]LPP = lodgepole pine; PP = ponderosa pine; WBP = whitebark pine; WWP = western white pine.

[2]Aerial surveys not flown.

Table 2.--Acres of State and private ownership in the Northern Region on which mountain pine beetle-caused mortality was observed, 1985 and 1986.

Reporting area	1985				1986			
	LPP[1]	PP	WBP	WWP	LPP	PP	WBP	WWP
Beaverhead NF	278	--	--	--	--	--	--	--
Bitterroot NF	--	666	--	--	--	3,329	--	--
Clearwater NF	--	--	--	--	--	--	--	2
Custer NF	5	184	110	--	1	25	272	--
Deerlodge NF	21	--	--	--	218	5	--	--
Flathead NF	100,550	9,001	1	316	67,814	3,973	--	174
Gallatin NF	2	2	2	2	2,354	--	40	--
Helena NF	189	581	--	--	280	1,008	60	--
ID Panhandle NF's	325	74	--	80	--	1	--	--
Kootenai NF	191,581	8,893	60	9	77,254	3,788	--	230
Lewis & Clark NF	1	19,726	--	--	128	2,851	--	--
Lolo NF	10,057	714	1	--	16,101	3,110	1	1
Nezperce NF	510	3	--	--	286	--	--	--
Stillwater SF	2	2	2	2	51,212	101	885	1,617
Swan River SF	12	1	6	28	2	2	2	2
Thompson River SF	659	173	--	--	1,961	187	--	--
Garnets	374	2,948	--	--	3	1,567	--	--
Mica FPD	--	10	--	--	--	2	--	--
Kendrick FPD	--	--	--	--	2	--	--	--
Cataldo FPD	500	--	--	--	500	--	--	--
Clrwtr/Ptltch FPD	--	--	--	--	--	--	1	--
Craig Mountains	4,360	1,417	--	--	6,082	555	--	--
Total	309,433	44,391	178	433	224,196	20,502	1,259	2,024

[1]LPP = lodgepole pine; PP = ponderosa pine; WBP = whitebark pine; WWP = western white pine.

[2]Aerial surveys not flown.

BEAVERHEAD NATIONAL FOREST

Beetle-caused mortality in both lodgepole and white bark pine continued to decrease in 1986. Acres infested declined from 4,467 in 1985 to 170 in 1986 (table 3). The extensive infestation once affecting the Madison Ranger District (RD) has finally ended (figure 1). New, widely scattered faders were observed on annual aerial detection surveys conducted on the Wisdom and Wise River RD's in 1986 (figure 2). Both Districts have large amounts of susceptible lodgepole pine, and the potential for these infestations to build is high.

Table 3.--Acres infested by mountain pine beetle, Beaverhead reporting area, 1985 and 1986.

	------Acres infested-------		
	1985	1986	
Ownership	LPP/WBP	LPP	WBP
Dillon RD	0	1	0
Madison RD	4,177	4	1
Sheridan RD	0	0	2
Wisdom RD	0	60	0
Wise River RD	0	102	0
State, private, other	290	0	0
Total	4,467	167	3

BITTERROOT NATIONAL FOREST

The outbreak in lodgepole and ponderosa pines increased from 2,400 acres in 1985 to 7,712 acres in 1986 (table 4). Major amounts of beetle-caused mortality in ponderosa pine are still occurring in both the East Fork and West Fork of the Bitterroot River, and in the Grouse Butte area southwest of Darby. Almost all of the lodgepole pine mortality is in susceptible stands within the Frank Church River of No Return Wilderness, West Fork RD, near Dennis Mountain (figure 3).

CUSTER NATIONAL FOREST

Acres of pine stands infested by mountain pine beetles increased slightly in 1986 (table 5). Scattered small groups of faded ponderosa pines were observed on the Ashland RD (figure 4). The outbreak in ponderosa pine stands in the Ekalaka Hills, Sioux RD, has subsided (figure 5). Whitebark pine mortality is,for the most part, confined to stands in the Pryor Mountains, Beartooth RD (figure 4).

Table 4.--Acres infested and trees killed per acre by mountain pine beetle; Bitterroot reporting area, 1985 and 1986.

Ownership	Host	Acres infested[1] 1985	1986	Average number trees killed/acre[2] Older	1985	1986	Total dead to date/acre
Darby RD	PP	925	942	18.2	34.2	62.5	114.9
	LPP	0	0	0	16.8	0.9	17.7
Sula RD	PP	0	459	19.8	81.1	65.7	166.6
	LPP	0	13	--	--	--	--
Stevensville RD	PP	1	25	--	--	--	--
	LPP	0	0	--	--	--	--
West Fork RD	PP	29	253	13.8	43.3	27.3	84.4
	LPP	779	2,690	0	1.8	5.8	7.6
	WWP	0	1	--	--	--	--
State, private, Other	PP	666	3,324	--	--	--	--
	LPP	0	5	--	--	--	--
Total/weighted avg.		2,400	7,712	16.9	54.2	52.5	123.6

[1]Aerial survey estimates.

[2]Ground survey data (averaged from number of stands visited).

Table 5.--Acres infested by mountain pine beetle, Custer reporting area, 1985 and 1986.

Ownership	Acres infested 1985 LPP	PP	WBP	1986 LPP	PP	WBP
Ashland RD	0	0	0	0	42	0
Beartooth RD	1	0	1	5	0	150
Sioux RD	0	215	0	0	232	0
State, private, other	5	264	110	1	25	272
Total	6	479	111	6	299	422

DEERLODGE NATIONAL FOREST

Acres of infested lodgepole pine decreased from 4,986 in 1985 to 2,748 in 1986 (figure 6). The Jefferson RD showed a decline of over 50 percent, while the other reporting areas had increases in infested acres. Although, overall, there was a decrease in acres infested, trees killed per acre in those areas that were ground surveyed increased fourfold (table 6). Most damage continued to be in the area north of Homestake Pass, Jefferson RD. From there northeast to Elder Creek Campground many susceptible lodgepole stands exist. Potential for increased infestation intensity is moderately high.

Table 6.--Acres of lodgepole pine infested and trees killed per acre by mountain pine beetle, Deerlodge reporting area, 1985 and 1986

Ownership	Acres infested 1985	Acres infested 1986	Average number trees killed/acre Older	Average number trees killed/acre 1985	Average number trees killed/acre 1986	Total dead to date/acre
Butte RD	0	163	0	8.4	36.6	45.0
Deerlodge RD	0	160	-	-	-	-
Jefferson RD	4,943	2,132	5.4	10.3	42.0	57.7
Phillipsburg RD	20	75	-	-	-	-
State, private, other	- 23	- 218	- -	- -	- -	- -
Total/ weighted avg.	4,986	2,748	5.0	10.1	41.6	56.7

FLATHEAD NATIONAL FOREST

Beetle-caused mortality in lodgepole pine stands increased from 225,497 acres in 1985 to 281,092 acres in 1986 (table 7). Glacier View, Hungry Horse, and Tally Lake RD's showed large increases, while Spotted Bear and Swan Lake RD's had overall decreases in infested acres. Despite decreases in aerial survey acres on the Swan RD, the infestation on the east side of Flathead Lake in the northern end of the Mission Range is continuing to build. The infestation on the Tally Lake RD has affected virtually all susceptible stands on the District and should begin to decline. Mortality in ponderosa pine stands covered 4,983 acres while whitebark pine stands and mature stands of western white pine are being severely impacted throughout the reporting area (figure 7).

GALLATIN NATIONAL FOREST

The once extensive outbreak on the Gallatin NF has been steadily decreasing since 1981. No surveys, aerial or ground, were conducted on the Forest in 1985; however, aerial surveys for 1986 showed 8,835 acres of lodgepole pine and 578 acres of whitebark pine are currently infested. These figures are down significantly from the 228,255 acres recorded in 1984. Current infestations exist in stands in the Gallatin and Bridger Mountains near Bozeman, the Absaroka Range south of Livingston, and the Crazy Mountains north of Livingston (figure 8).

Table 7.--Acres of host infested and lodgepole pine killed per acre by mountain pine beetle, Flathead reporting area, 1985 and 1986.

Ownership	Host	Acres infested 1985	Acres infested 1986	Average number trees killed/acre Older	Average number trees killed/acre 1985	Average number trees killed/acre 1986	Total dead to date/acre
Glacier View RD	LPP	921	19,731	57.6	61.5	46.9	166.0
	WBP	1,107	670	--	--	--	--
	WWP	245	315	--	--	--	--
Hungry Horse RD	LPP	1,331	14,215	4.1	42.5	13.3	59.9
	WBP	458	531	--	--	--	--
	WWP	1,036	636	--	--	--	--
Spotted Bear RD	LPP	292	204	--	--	--	--
	WBP	70	43	--	--	--	--
	WWP	110	74	--	--	--	--
Swan Lake RD	LPP	23,279	2,077	13.3	51.5	37.8	102.6
	PP	62	2	--	--	--	--
	WBP	683	2	--	--	--	--
	WWP	183	29	--	--	--	--
Tally Lake RD	LPP	99,124	173,085	32.6	79.7	57.5	169.8
	PP	0	360	--	--	--	--
	WWP	0	0	--	--	--	--
State, private, other	LPP	100,550	71,780	--	--	--	--
	PP	9,001	4,621	--	--	--	--
	WBP	1	0	--	--	--	--
	WWP	316	174	--	--	--	--
Total/weighted avg.		238,769	288,549	27.8	65.6	46.0	139.4

HELENA NATIONAL FOREST

Outbreaks in lodgepole pine stands increased from 1,531 acres in 1985 to 2,731 acres in 1986. An increase from 792 acres in 1985 to 2,087 acres in 1986 also occurred in infested ponderosa pine stands (table 8). Most damage in lodgepole pine is on the Townsend RD in the Deep Creek area (figure 9). Ground surveys conducted in that area showed an average of 15.0 trees per acre killed prior to 1985, another 15.0 per acre killed in 1985, and 5.2 per acre killed in 1986. Though a decreasing trend is indicated, an average of more than 35 trees per acre have been killed in those stands surveyed.

Damage in ponderosa pine stands continued on State and private lands in the Wolf Creek area, in the Dry Range north of Fort Logan, and west of the Smith River. Mortality also increased in ponderosa pine stands on the Lincoln RD (figure 9).

Table 8.--Acres infested by mountain pine beetle, Helena reporting area, 1985 and 1986.

	Acres infested					
	1985			1986		
Ownership	LPP	PP	WBP	LPP	PP	WBP
Canyon Ferry RD	0	39	0	0	357	0
Helena RD	2	169	0	5	11	0
Lincoln RD	5	3	48	42	499	0
Townsend RD	1,335	0	0	2,386	70	0
State, private, other	189	581	0	280	1,150	60
Total	1,531	792	48	2,713	2,087	60

IDAHO PANHANDLE NATIONAL FORESTS

The mountain pine beetle infestation in lodgepole pine stands within the IPNF's reporting area was largely concentrated on private lands surrounding the Louisiana-Pacific mill at Moyie Springs. Through a combined program of rapid utilization of infested logs, preventive and suppressive pesticide treatments, sanitation logging, and stand hazard reduction, beetle populations have returned to near endemic conditions (table 9). National Forest lands on the Bonners Ferry RD are being evaluated for potential population buildups. Surveys in mature to overmature lodgepole pine stands were conducted in 1986 to assess current beetle activity. Though extensive stands of high-hazard lodgepole pine exist, beetle populations remain low. Greatest potential for future losses exists in stands in the Boulder Creek drainage. Timber sales planned in those stands should reduce that potential. Beetle-caused mortality in other host species throughout the area remained light and mostly scattered (figure 8).

Table 9.--Acres infested by mountain pine beetle, Idaho Panhandle reporting area, 1985 and 1986.

	Acres infested						
	1985			1986			
Ownership	LPP	PP	WWP	LPP	PP	WBP	WWP
Bonners Ferry RD	41	11	710	58	0	22	0
Fernan RD	0	0	0	0	34	1	1
Priest Lake RD	0	0	64	0	0	0	1
St. Maries RD	0	0	1	0	0	0	0
State, private, other	326	76	104	0	0	0	0
Total	367	87	879	58	34	23	2

KOOTENAI NATIONAL FOREST

Acreage infested by mountian pine beetles decreased Forestwide, though some areas maintained still-increasing populations. In lodgepole pine stands, infested acres decreased from 554,979 in 1985 to 413,989 in 1986. Ponderosa pine stands being impacted decreased from 21,183 acres to 8,498 acres (table 10). Most ponderosa pine mortality occurred on the Fisher River and Libby RD's and surrounding State and private lands. In lodgepole pine stands, the infestation continued a rapid buildup on the Fisher River and Libby RD's and the southern portion of the Fortine RD. The infestation on the Yaak RD, first detected in 1972, continued to decline (figure 10).

Table 10.--Acres infested and trees killed per acre by mountain pine beetle, Kootenai reporting area, 1985 and 1986.

Ownership	Host	Acres infested 1985	Acres infested 1986	Average number trees killed/acre Older	Average number trees killed/acre 1985	Average number trees killed/acre 1986	Total dead to date/acre
Cabinet RD	LPP	4,888	5,689	2.4	30.7	5.2	38.3
	PP	2	79	--	--	--	--
	WBP	0	5	--	--	--	--
	WWP	406	217	--	--	--	--
Fisher River RD	LPP	174,405	147,745	24.3	33.7	69.7	127.7
	PP	9,748	3,851	2.9	4.4	1.6	8.9
	WWP	3	0	--	--	--	--
Fortine RD	LPP	19,291	52,104	20.3	33.7	66.8	120.8
	PP	191	1	--	--	--	--
Libby RD	LPP	53,070	60,253	17.2	31.5	88.5	137.2
	PP	1,846	754	0	1.1	5.8	6.9
	WBP	202	0	--	--	--	--
	WWP	94	206	--	--	--	--
Rexford RD	LPP	28,081	35,998	16.1	25.0	32.2	73.3
	PP	344	0	--	--	--	--
	WWP	24	32	--	--	--	--
Troy RD	LPP	1,433	942	27.9	14.8	20.2	62.9
	PP	159	25	--	--	--	--
	WWP	320	77	--	--	--	--
Yaak RD	LPP	82,230	33,824	--	--	--	--
	WWP	123	99	--	--	--	--
State, private, other	LPP	191,581	77,254	--	--	--	--
	PP	8,893	3,788	--	--	--	--
	WBP	60	0	--	--	--	--
	WWP	9	230	--	--	--	--
Total/weighted average	LPP	554,979	413,809	19.4	30.8	65.0	115.2
	PP	21,183	8,498	1.5	2.8	3.6	7.9
Species total		577,403	423,173	19.0	30.4	63.2	112.6

LEWIS & CLARK NATIONAL FOREST

Damage in ponderosa pine stands decreased from 26,630 acres in 1985 to 5,715 acres in 1986. Beetle-caused mortality in lodgepole pine stands increased from 68 acres to 250 acres (table 11). Most ponderosa pine mortality was north and south of Lewistown in the Judith and Snowy Mountains. Some concentrated damage also occurred in the Judith River, Belt Creek, and Pilgrim Creek drainages. Lodgepole pine stands in the Castle Mountains sustained most of the mortality in the reporting area (figure 11). Evaluations conducted in 1986 to determine current mortality levels in ponderosa pine stands showed an average 9.2 trees per acre older mortality, 33.6 trees per acre killed in 1985, and 6.3 trees per acre killed in 1986. Surveys in lodgepole pine stands indicated that, for those areas surveyed, an average of 14.3 older dead trees per acre was recorded, 1.3 trees per acre were killed in 1985, and another 3.3 trees per acre were attacked in 1986.

Table 11.--Acres infested by mountain pine beetle, Lewis & Clark reporting area, 1985 and 1986.

	--------Acres infested---------			
	1985		1986	
Ownership	LPP	PP	LPP	PP
Judith RD	0	1,188	0	896
Kings Hill RD	66	575	72	498
Musselshell RD	1	2,744	40	525
State, private, other	1	22,123	138	3,796
Total	68	26,630	250	5,715

LOLO NATIONAL FOREST

Total acres of host species infested by beetles throughout the reporting area increased to 54,587 in 1986--up from 36,621 acres in 1985 (table 12). Mortality in lodgepole pine stands increased to 48,116 acres in 1986 from 30,582 acres the previous year. Most of that increase was recorded in the Thompson River drainage, Plains/Thompson Falls RD; however, significant damage is still occurring on the Ninemile RD (figure 12). On the Ninemile RD, though total infested acres were less in 1986, some areas surveyed showed more than a twofold increase in attacked trees in 1986 compared to 1985.

Beetle-caused mortality in ponderosa pine stands increased from 4,923 acres to 5,581 acres in 1986. Impacts are most notable in the Thompson River and Blackfoot River drainages and in the Garnet Mountains (figure 13).

Table 12.--Acres infested and trees killed per acre by mountain pine beetle, Lolo reporting area, 1985 and 1986.

Ownership	Host	Acres infested 1985	Acres infested 1986	Average number trees killed/acre Older	Average number trees killed/acre 1985	Average number trees killed/acre 1986	Total dead to date/acre
Missoula RD	LPP	0	23	--	--	--	--
	PP	71	92	--	--	--	--
	WBP	0	10	--	--	--	--
Ninemile RD	LPP	4,225	1,926	24.6	26.7	61.0	112.3
	PP	313	490	3.8	20.1	11.2	35.1
	WBP	0	2	--	--	--	--
Plains RD	LPP	13,012	27,603	42.9	48.1	24.4	115.4
	PP	451	13	--	--	--	--
	WBP	0	2	--	--	--	--
	WWP	1	1	--	--	--	--
Seeley Lake RD	LPP	230	9	--	--	--	--
	PP	1	4	--	--	--	--
	WBP	779	534	--	--	--	--
Superior RD	LPP	374	559	--	--	--	--
	PP	371	191	--	--	--	--
Thompson Falls RD	LPP	2,205	2,892	26.7	66.0	17.2	109.9
	PP	40	87	--	--	--	--
	WBP	335	301	--	--	--	--
	WWP	1	38	--	--	--	--
Garnet Mtns.	LPP	389	3	--	--	--	--
	PP	2,962	1,593	21.6	24.2	60.0	105.8
State, private, other	LPP	10,057	16,101	--	--	--	--
	PP	714	3,111	--	--	--	--
	WBP	1	1	--	--	--	--
	WWP	0	1				
Total	LPP	30,582	48,116	38.2	45.0	31.2	114.4
	PP	4,923	5,581	14.5	22.6	40.4	77.5
Species total/ weighted average		36,621	54,587	32.2	39.4	33.6	105.2

NEZPERCE NATIONAL FOREST

Most beetle-caused mortality in the Nezperce reporting area is confined to the Elk City and Red River RD's and surrounding State and private land (figure 14). Affected acreage increased to 5,933 acres in 1986--up from 4,792 acres in 1985 (table 13). Ground surveys indicated small increases in attacked trees also occurred in 1986. Damage to ponderosa pine stands remained minor Forestwide.

Table 13.--Acres infested and trees killed per acre by mountain pine beetle, Nezperce reporting area, 1985 and 1986.

Ownership	Host	Acres infested		Average number trees killed/acre			Total dead to date/acre
		1985	1986	Older	1985	1986	
Elk City RD	LPP	23	350	10.7	0	2.2	12.9
	PP	2	0	--	--	--	--
Red River RD	LPP	4,793	5,293	17.9	15.4	18.2	51.5
	PP	2	2	--	--	--	--
State, private, other	LPP	510	290	--	--	--	--
	PP	3	25	--	--	--	--
Total		5,333	5,960	17.3	14.0	16.7	48.0

GLACIER NATIONAL PARK

The enormous beetle infestation which swept through lodgepole pine stands in Glacier NP in the late 1970's and early 1980's continued its decline. Affected acres declined from over 12,000 acres in 1985 to less than 2,600 acres in 1986 (table 14). Most mortality occurred in lodgepole and western white pine stands in the southwestern part of the Park--along drainages flowing into the Middle Fork of the Flathead River (figure 15). Small, but building infestations were observed in lodgepole pine stands in the Lincoln Creek and Pinchot Creek drainages. Chronic damage continued in mature western white pine stands near Coal Creek.

Table 14.--Acres infested by mountain pine beetle, Glacier National Park, 1985 and 1986.

Host	Acres infested	
	1985	1986
LPP	12,412	1,956
PP	1	0
WBP	157	0
WWP	58	551
Total	12,628	2,507

YELLOWSTONE NATIONAL PARK

Like Glacier NP, Yellowstone NP at one time harbored one of the most extensive beetle infestations in the Region. And also like the Glacier infestation, the one in Yellowstone has nearly ended. Only 310 acres, combined lodgepole and whitebark pine, were recorded as currently infested in 1986. That figure had decreased from 6,929 acres in 1985. Most of the remaining infested stands are located near Tower Creek. A small outbreak in limber pine, of about 15 acres, occurred near Mammoth (figure 16).

BLACKFEET INDIAN RESERVATION

The outbreak on the Blackfeet IR, which is closely associated with that on the eastern portion of Glacier NP, declined in 1986 (figure 17). Where 4,188 acres were infested in 1985, only 704 acres were noted in the 1986 survey (table 15). Ground surveys not only confirmed that decline, but recorded what was apparently a high amount of brood mortality during the winter of 1985-86. Few of the trees attacked and killed in 1985 produced new adults. As a result, a small number of 1986 attacks were observed. Though susceptible lodgepole pine stands remain, we anticipate the beetle population will be low for several years.

Table 15.--Acres infested and trees killed per acre by mountain pine beetle, Indian Reservations in eastern Montana, 1985 and 1986.

Reservation	Host	Acres infested		Average number trees killed/acre			Total dead to date/acre
		1985	1986	Older	1985	1986	
Blackfeet	LPP	4,188	704	16.2	12.5	3.2	31.9
Crow	PP	5,717	5,301	20.0	33.8	35.2	89.0
N. Cheyenne[1]	PP	2,836	2,556	5.6	23.9	41.6	71.1
Ft. Belknap[1]	PP	925	405	18.2	35.7	13.4	67.3
Rocky Boy's	LPP/PP	NA	948	14.9	13.3	3.8	32.0

[1]Includes adjacent BLM lands.

CROW INDIAN RESERVATION

Beetle-caused mortality in ponderosa pine stands in the Wolf Mountains east of Lodge Grass decreased slightly in 1986--from 5,717 acres in 1985 to 5,301 acres (figure 18). Ground collected data suggest the infestation is virtually static. In the stands surveyed, estimates indicated that 34 trees per acre were killed in 1985. In 1986, mortality averaged 35 trees per acre (table 15). That infestation will likely continue at about that same level until stand susceptibility is reduced by the beetle or through management activities.

NORTHERN CHEYENNE INDIAN RESERVATION

The Northern Cheyenne IR is experiencing two distinct beetle infestations. One, east of Lame Deer, has existed since 1980 and is now beginning to decline. The other, south of Busby, along the Rosebud River, is newer and appears to be building rapidly (figure 18). Ground data indicated new attacks nearly doubled from 1985 to 1986 in those stands surveyed in the Rosebud River drainage. Total infested acres on the Reservation decreased slightly from 2,836 acres in 1985 to 2,556 in 1986 (table 15).

FLATHEAD INDIAN RESERVATION

Mortality attributed to mountain pine beetle in ponderosa pine stands decreased slightly from 1,825 acres in 1985 to 1,743 acres in 1986 (table 16). Though it is scattered throughout the Reservation, it is especially noticeable in the Hog Heaven area northwest of Elmo (figure 19).

Damage in lodgepole pine stands also declined in 1986. Most is found in the northwestern corner of the Reservation, from Bassoo Peak south to Hot Springs. Other scattered mortality was noted in the southern portion of the Reservation. A few small groups of whitebark pine faders were recorded at higher elevations above the Jocko River near Arlee.

Table 16.--Acres infested by mountain pine beetle, Flathead Indian Reservation, 1985 and 1986.

	Acres infested	
Host	1985	1986
LPP	1,923	1,674
PP	1,825	1,743
WBP	139	291
Total	3,887	3,708

FORT BELKNAP INDIAN RESERVATION

The beetle outbreak in ponderosa pine stands in the Little Rocky Mountains decreased from 925 acres in 1985 to 405 acres in 1986 (table 15). Much of the recorded mortality is actually on adjacent Bureau of Land Management (BLM) lands northeast of Zortman (figure 20). Ground data suggest a declining trend in beetle populations in that area.

ROCKY BOY'S INDIAN RESERVATION

The Reservation was not surveyed in 1985 so comparative estimates of the extent of the infestation cannot be made. In 1986, 593 acres of infested ponderosa pine and 355 acres of infested lodgepole pine were recorded (table 15). Most mortality observed was south of Rocky Boy's Agency in Big Sandy Creek and Muddy Creek drainages (figure 20). Ground surveys conducted in that area showed amounts of overwintering brood mortality similar to those noted on the Blackfeet IR. In protected areas of Green Creek near the southern boundary of the Reservation, a number of new attacks were observed in lodgepole pine. Stand conditions there indcate a high probability of population buildups.

STILLWATER, SWAN RIVER, THOMPSON RIVER STATE FOREST (MONTANA)

The Stillwater State Forest was not flown in 1985. In 1986, more than 51,000 acres were observed to have some beetle-caused mortality in lodgepole pine stands (table 2). Though that was a major increase over infested area recorded in 1984 (1,336 acres), much of that mortality is fairly scattered. Because of the lengthy history of beetle infestations in that area, we do not anticipate continued increases.

The Swan River State Forest was not flown in 1986; however, damage recorded in 1985 was light and scattered. Only 47 acres, in all host species, were observed to contain beetle-killed trees (table 2).

The Thompson River State Forest continued to show some scattered mortality in both lodgepole and ponderosa pine stands. Acreage of infested lodgepole pine increased from 659 acres in 1985 to over 1,900 acres in 1986. Ponderosa pine mortality remained static at 187 total acres (table 2).

MICA, KENDRICK, CATALDO, AND CLEARWATER/POTLATCH FIRE PROTECTION DISTRICTS (IDAHO)

Mortality attributable to mountain pine beetle in those fire protection districts surveyed in northern Idaho remained mostly light and scattered in 1986 (table 2). The most notable infestation caused approximately 500 acres of lodgepole pine mortality on the Cataldo FPD southwest of Pinehurst. That infestation has persisted for several years.

CRAIG MOUNTAINS (IDAHO)

The infestation in the Craig Mountains south of Lewiston continued at about the same level as recorded in 1985. Then, 4,360 acres of lodgepole pine and 1,417 acres of ponderosa pine were infested. In 1986, those figures were 6,082 acres and 555 acres, respectively. Ground surveys conducted in 1985 showed the infestation near Soldiers Meadow Reservoir appears to be moving from severely depleted lodgepole pine stands to nearby ponderosa pine. We believe that is the case despite aerial survey estimates that suggest infested acres of lodgepole pine are increasing while affected ponderosa pine acres are decreasing.

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McGregor, M. D., K. E. Gibson, S. Tunnock, L. E. Stipe, H. E. Meyer, and R. D. Oakes. 1985. Status of mountain pine beetle infestations, Northern Region, 1984. USDA For. Serv., North. Reg., Coop. For. & Pest Mgt. Rept. 85-25. 57 pp.

Tunnock, S., M. D. McGregor, R. D. Oakes, and H. E. Meyer. 1986. Mountain pine beetle infestations in the Northern Region during 1985. USDA For. Serv., North. Reg., Coop. For. & Pest Mgt. Rept. 86-9. 47 pp.

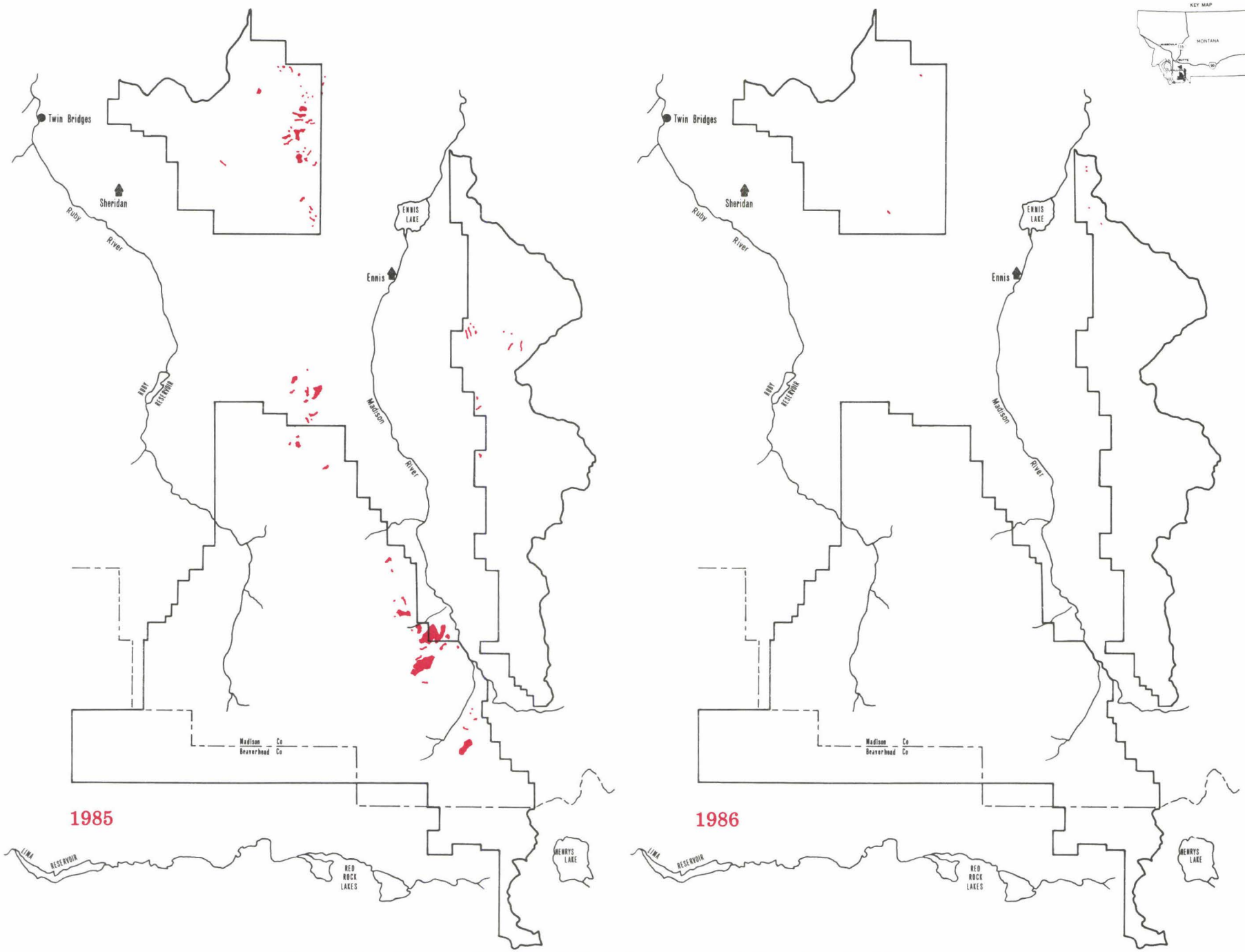


Figure 1.--Areas of pines infested by mountain pine beetle, Beaverhead National Forest area(east half), Montana.

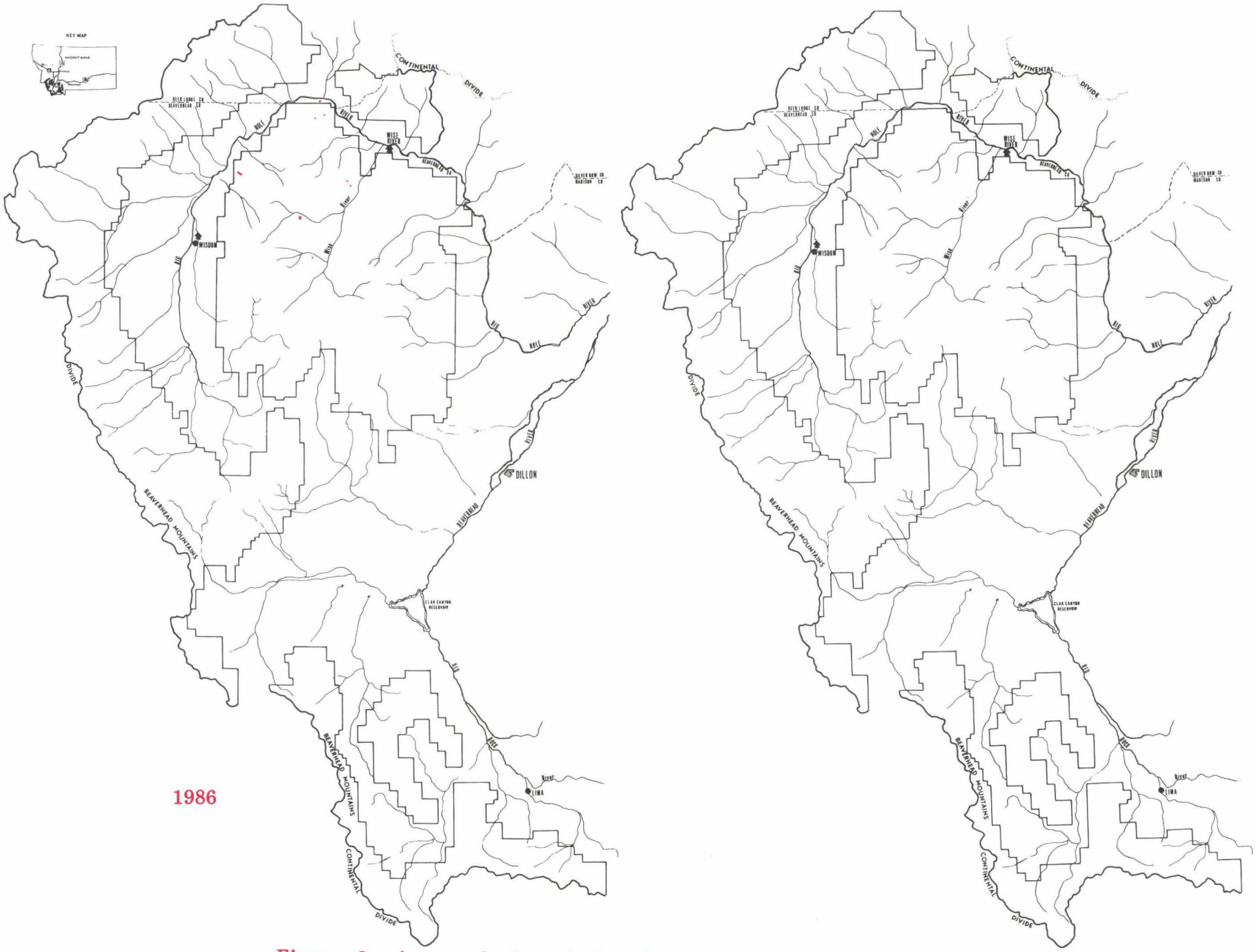


Figure 2.--Areas of pines infested by mountain pine beetle, Beaverhead National Forest area(west half), Montana.

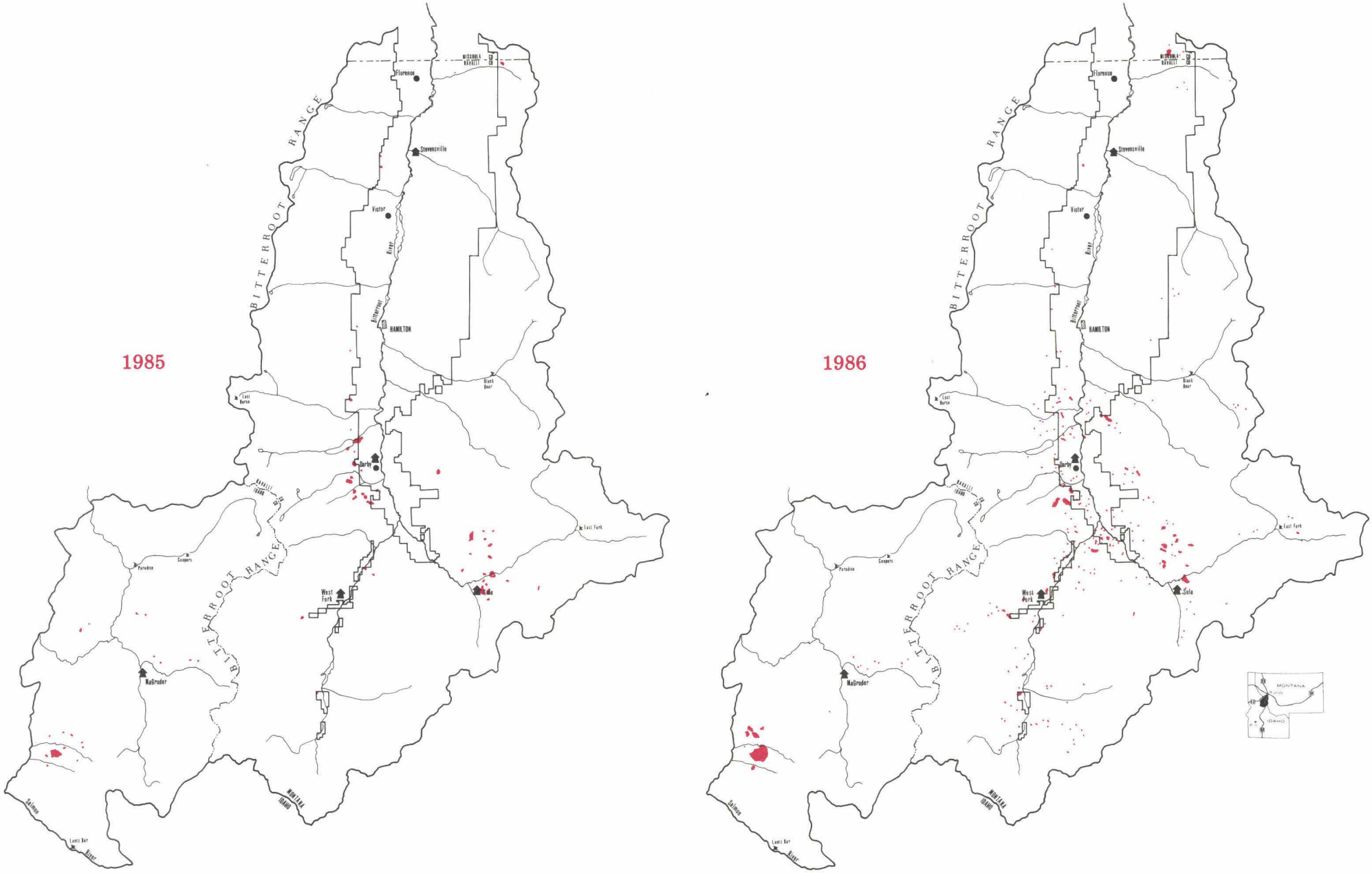


Figure 3.--Areas of pines infested by mountain pine beetle, Bitterroot National Forest area, Montana.

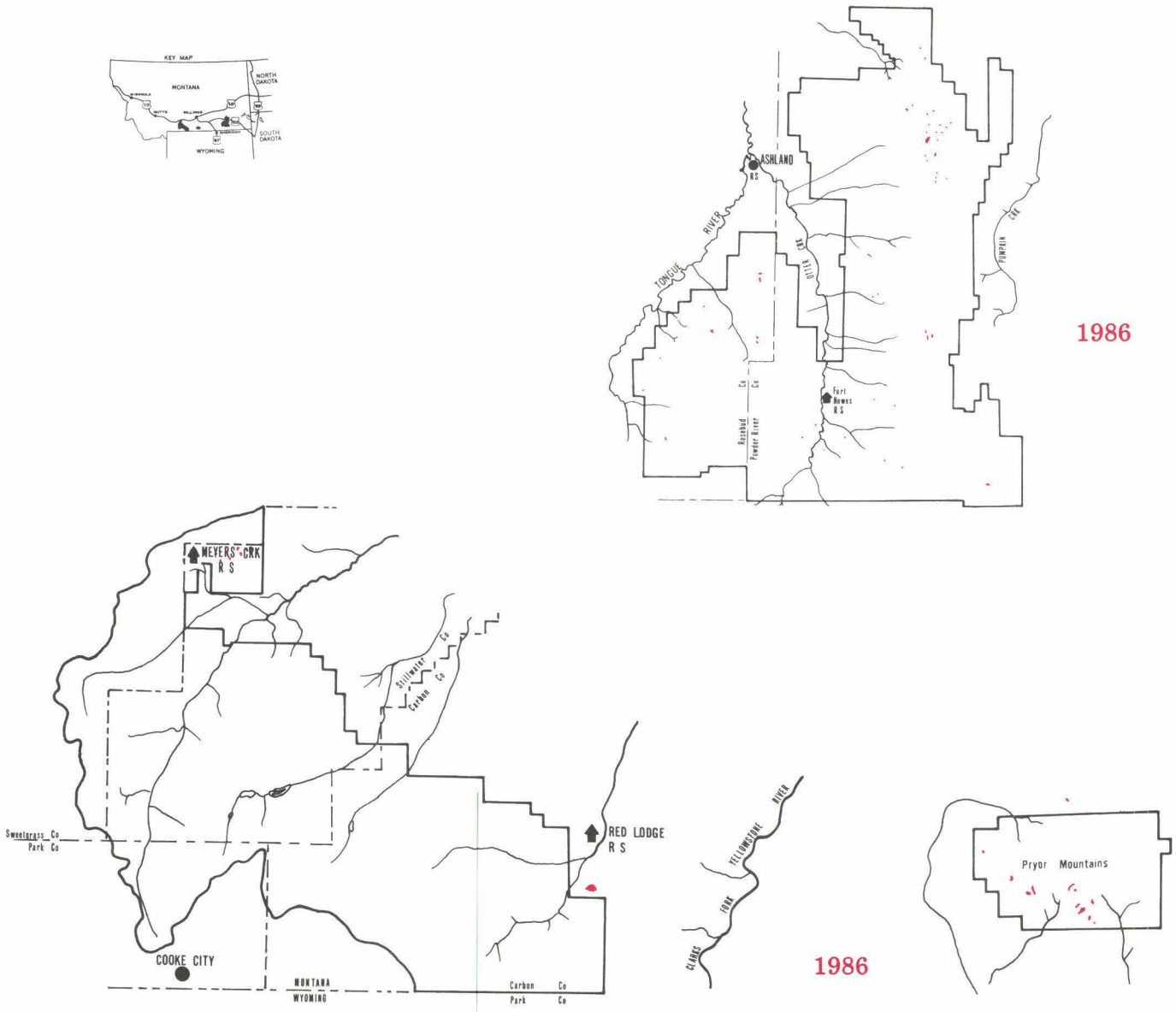


Figure 4.--Areas of pines infested by mountain pine beetle, Custer National Forest area(Ashland & Beartooth Divisions), Montana.

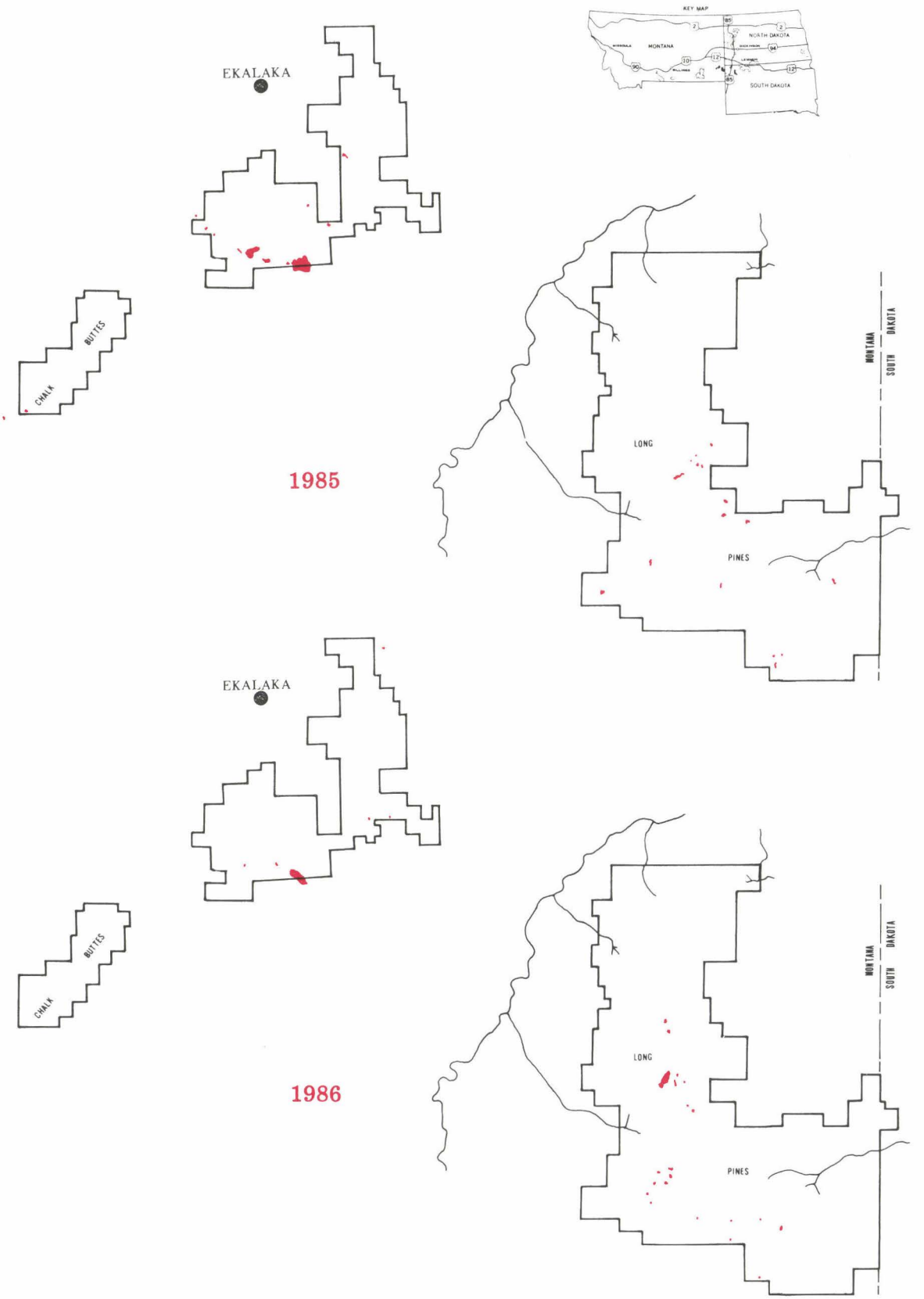


Figure 5.--Areas of pines infested by mountain pine beetle, Custer National Forest area(Sioux Division), Montana.

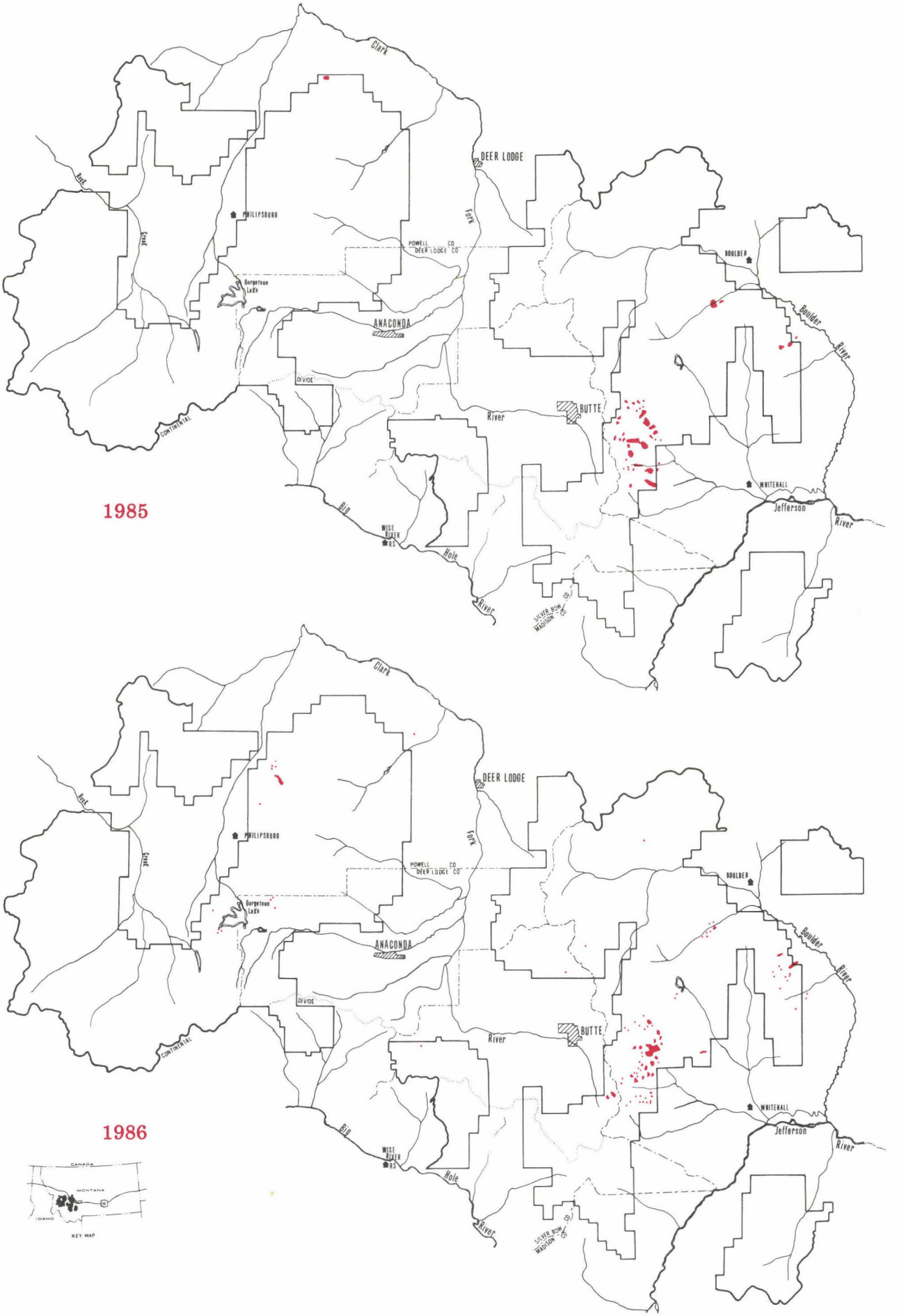


Figure 6.--Areas of pines infested by mountain pine beetle, Deerlodge National Forest area, Montana

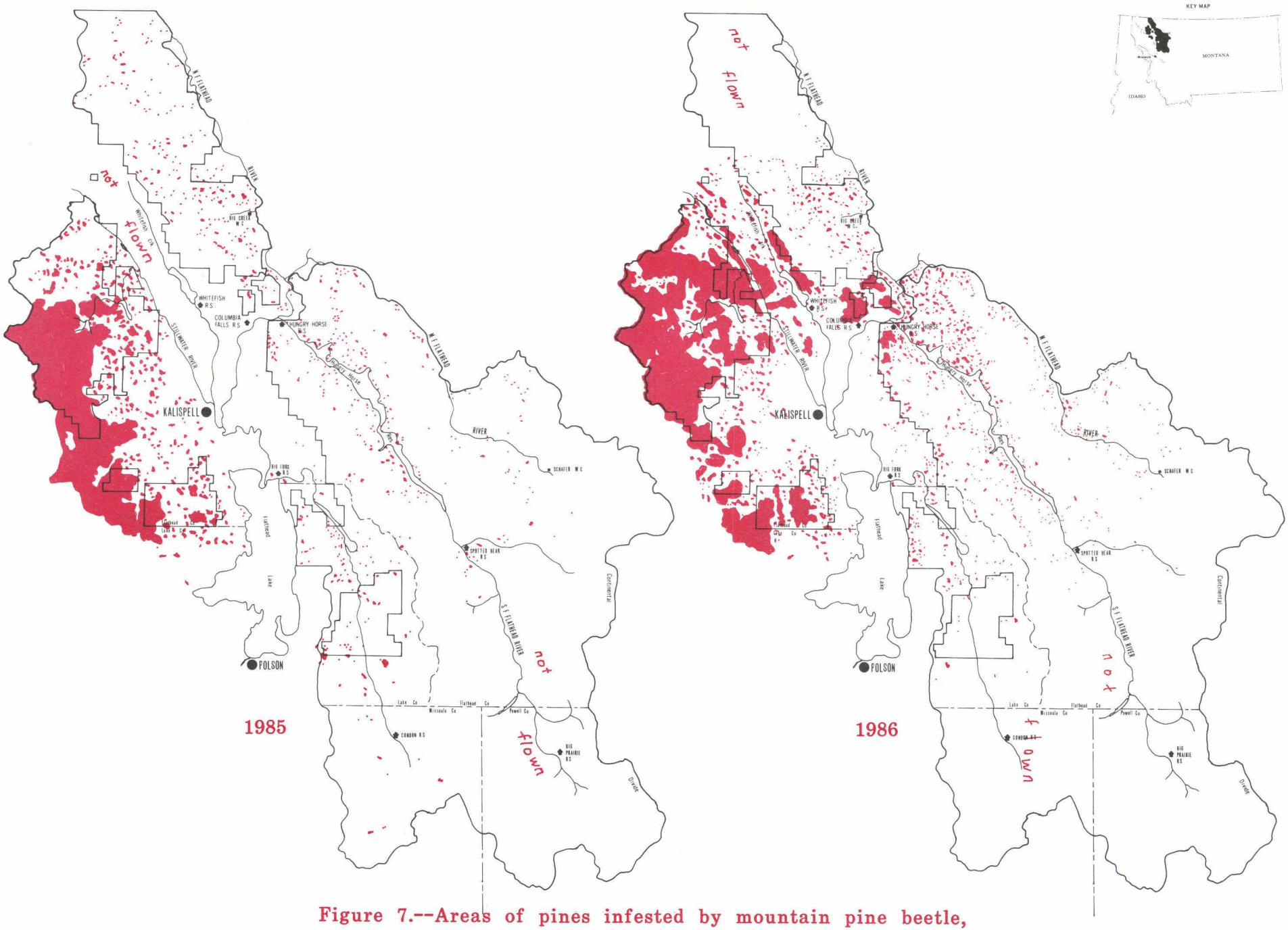
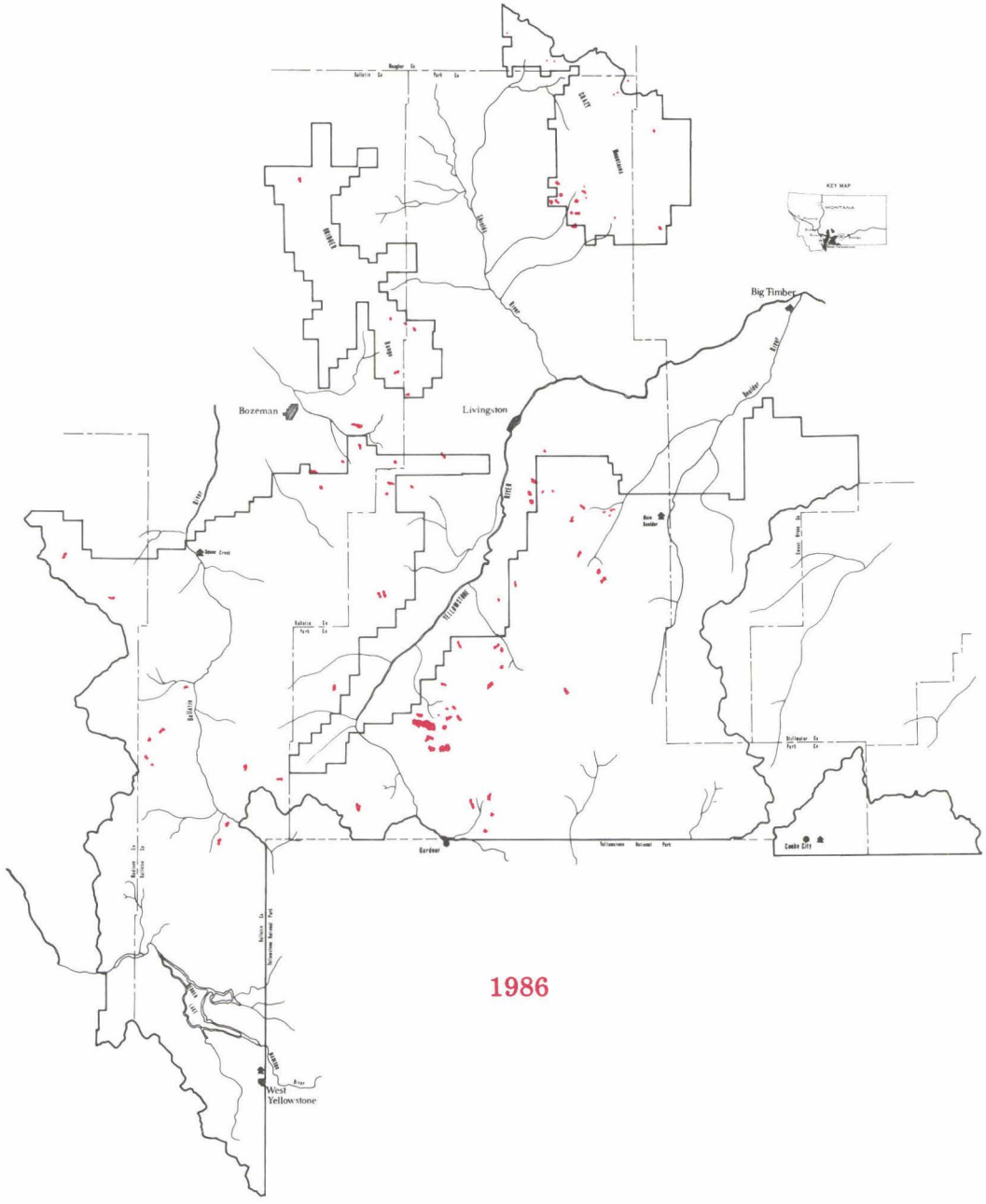


Figure 7.--Areas of pines infested by mountain pine beetle, Flathead National Forest area, Montana.



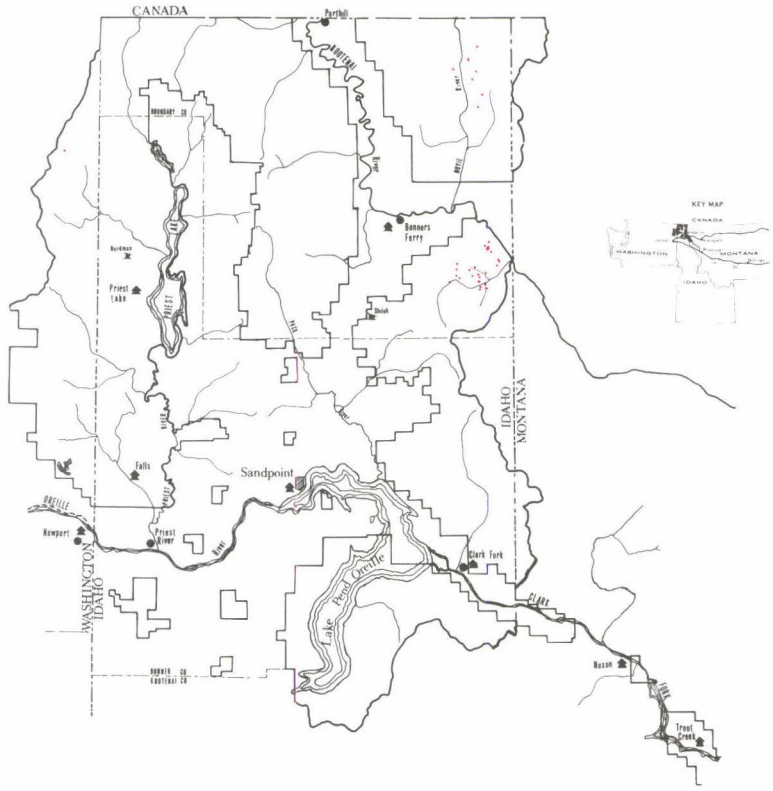


Figure 8.--Areas of pines infested by mountain pine beetle, Gallatin National Forest area, Montana, & Kaniksu National Forest area, Idaho.

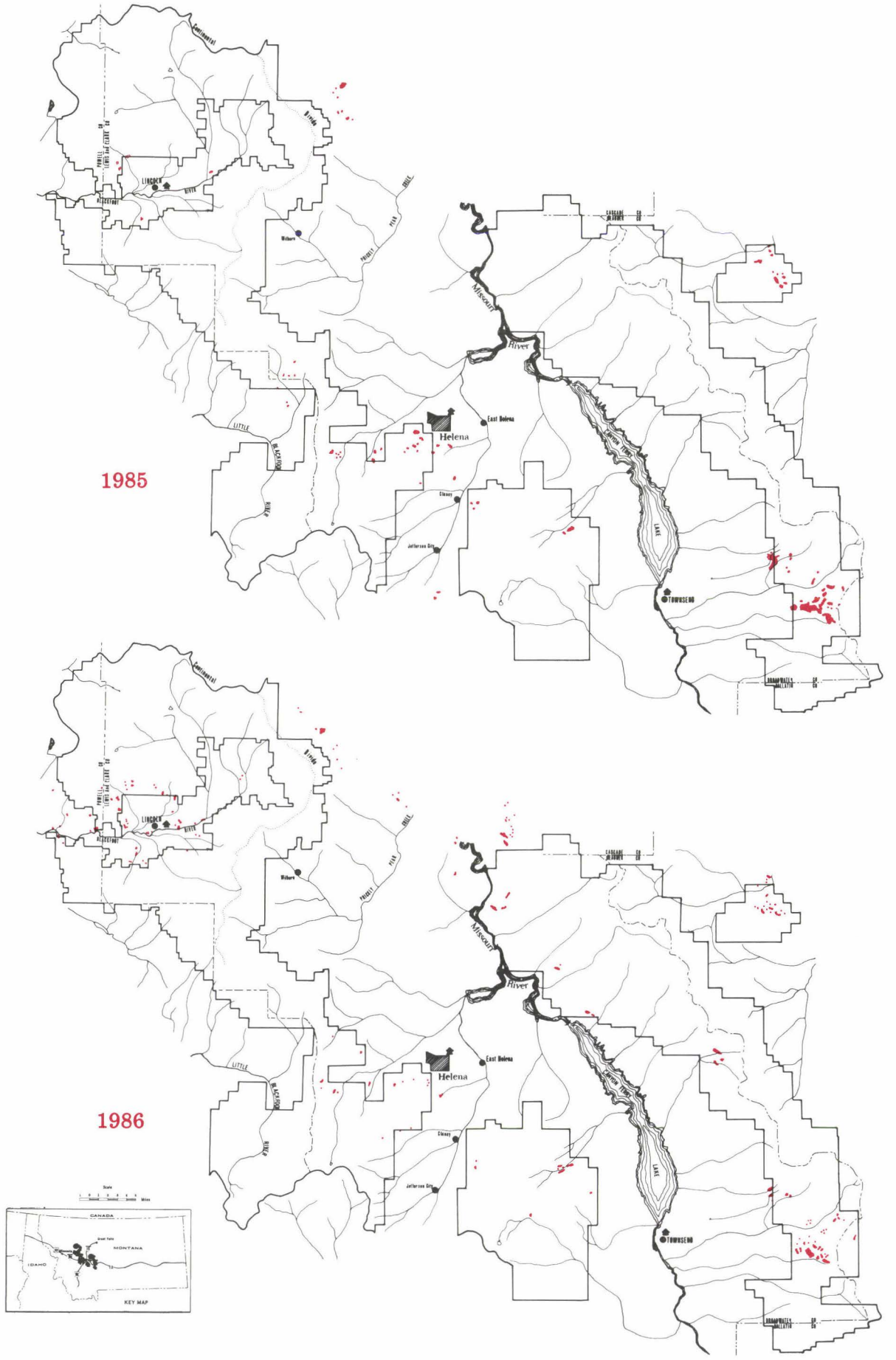


Figure 9.--Areas of pines infested by mountain pine beetle, Helena National Forest area, Montana.

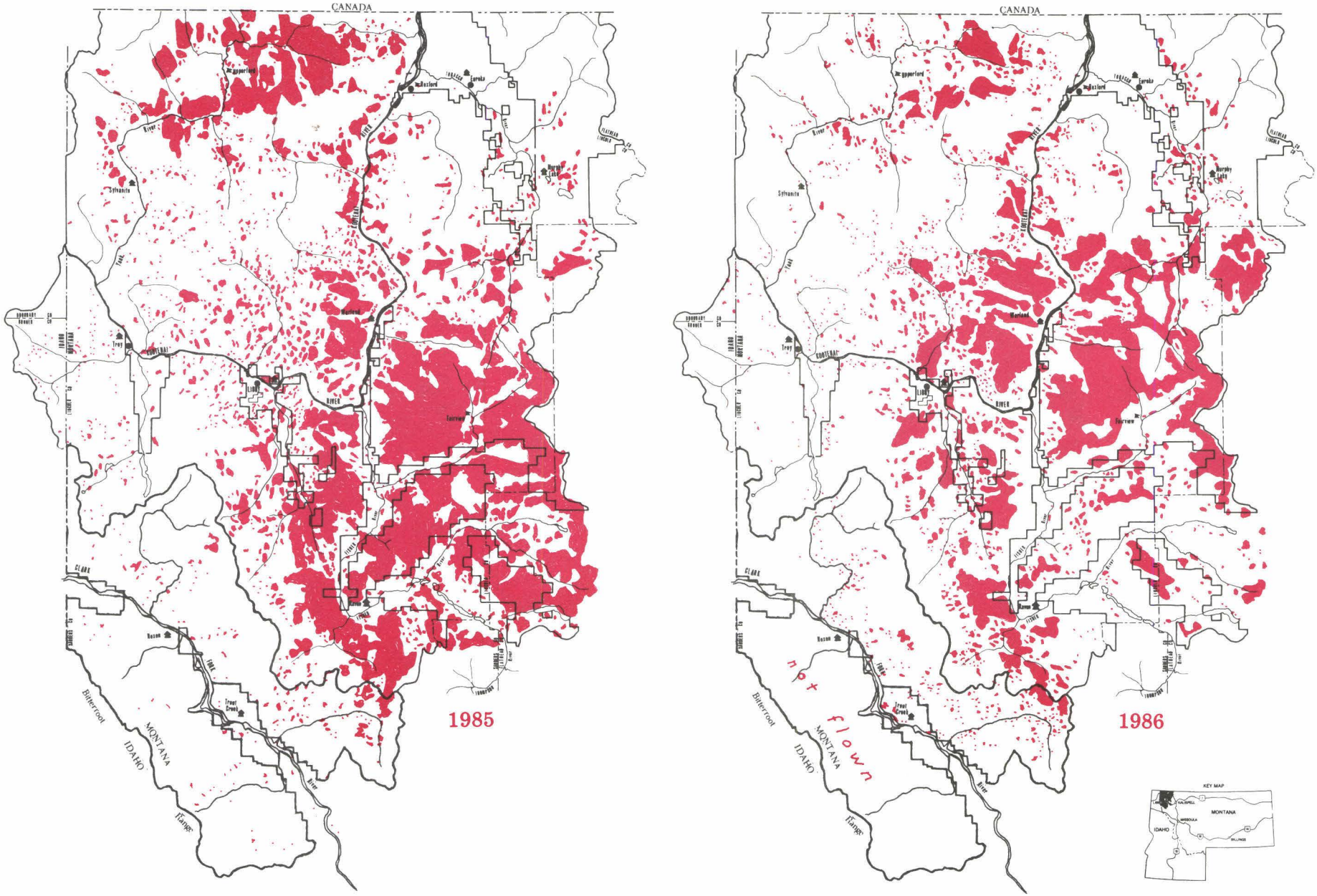


Figure 10.--Areas of pines infested by mountain pine beetle, Kootenai National Forest area, Montana.

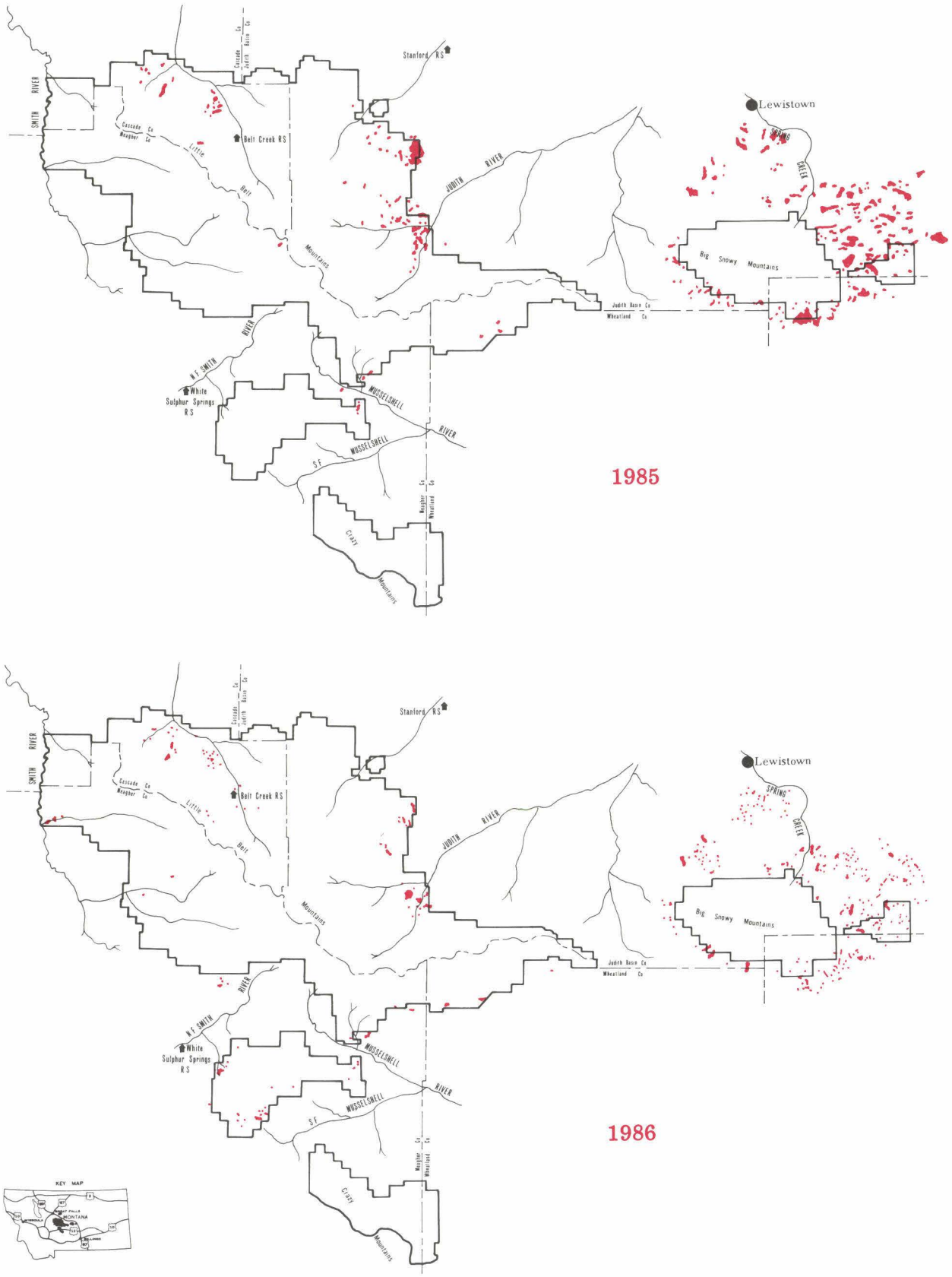


Figure 11.--Areas of pines infested by mountain pine beetle, Lewis & Clark National Forest area, Montana.

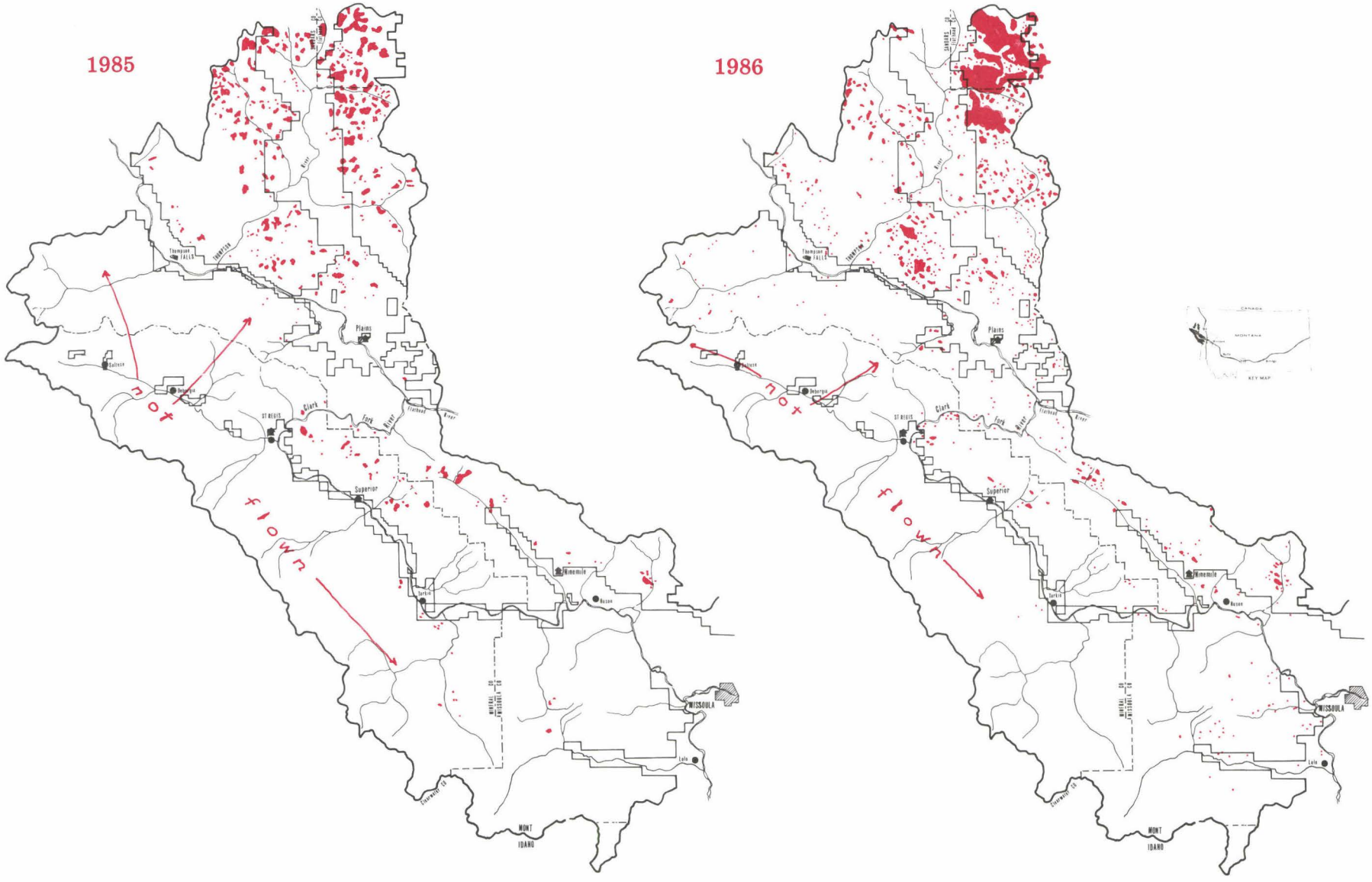


Figure 12.--Areas of pines infested by mountain pine beetle, Lolo National Forest area(west half), Montana.

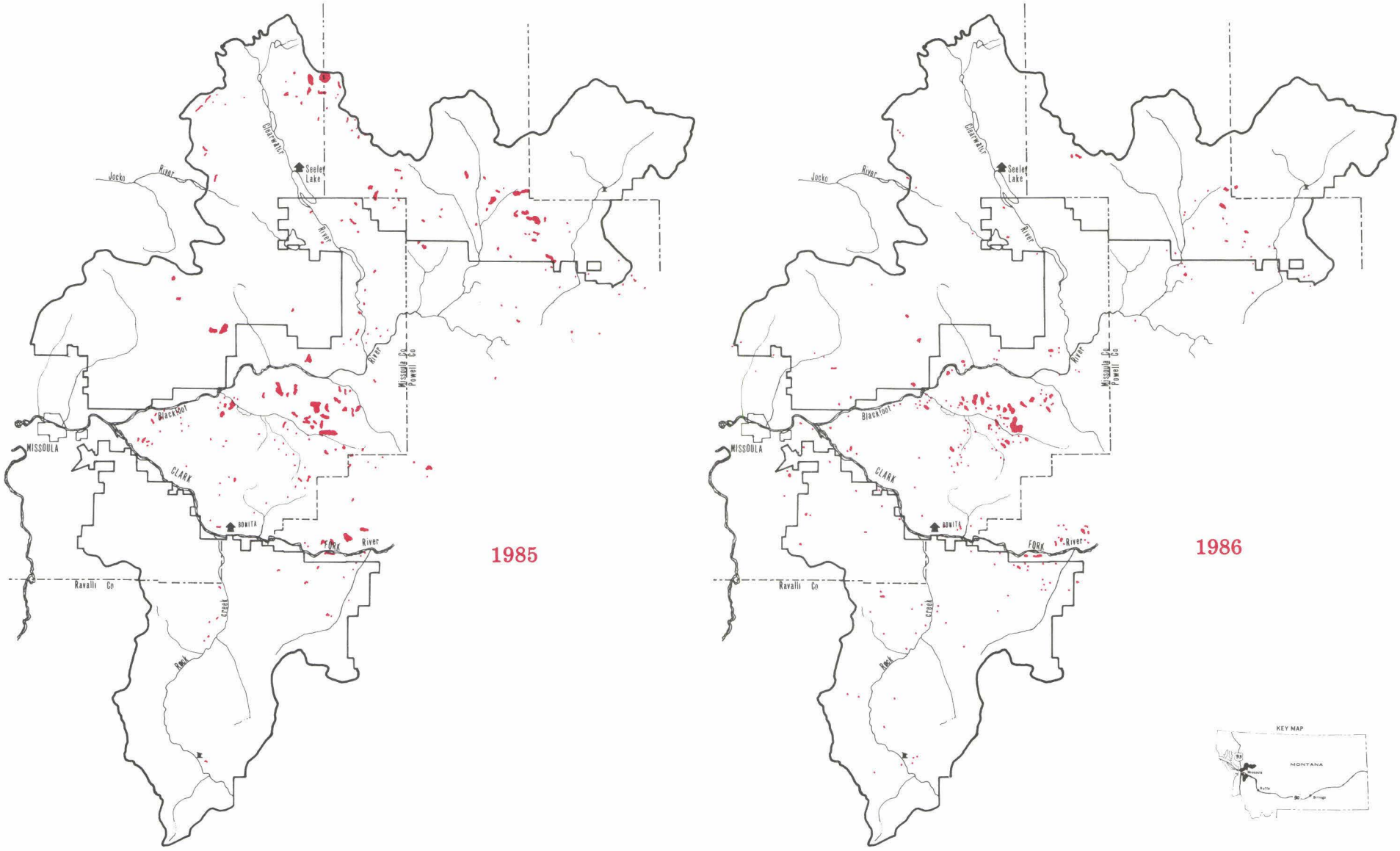


Figure 13.--Areas of pines infested by mountain pine beetle, Lolo National Forest area(east half), Montana.

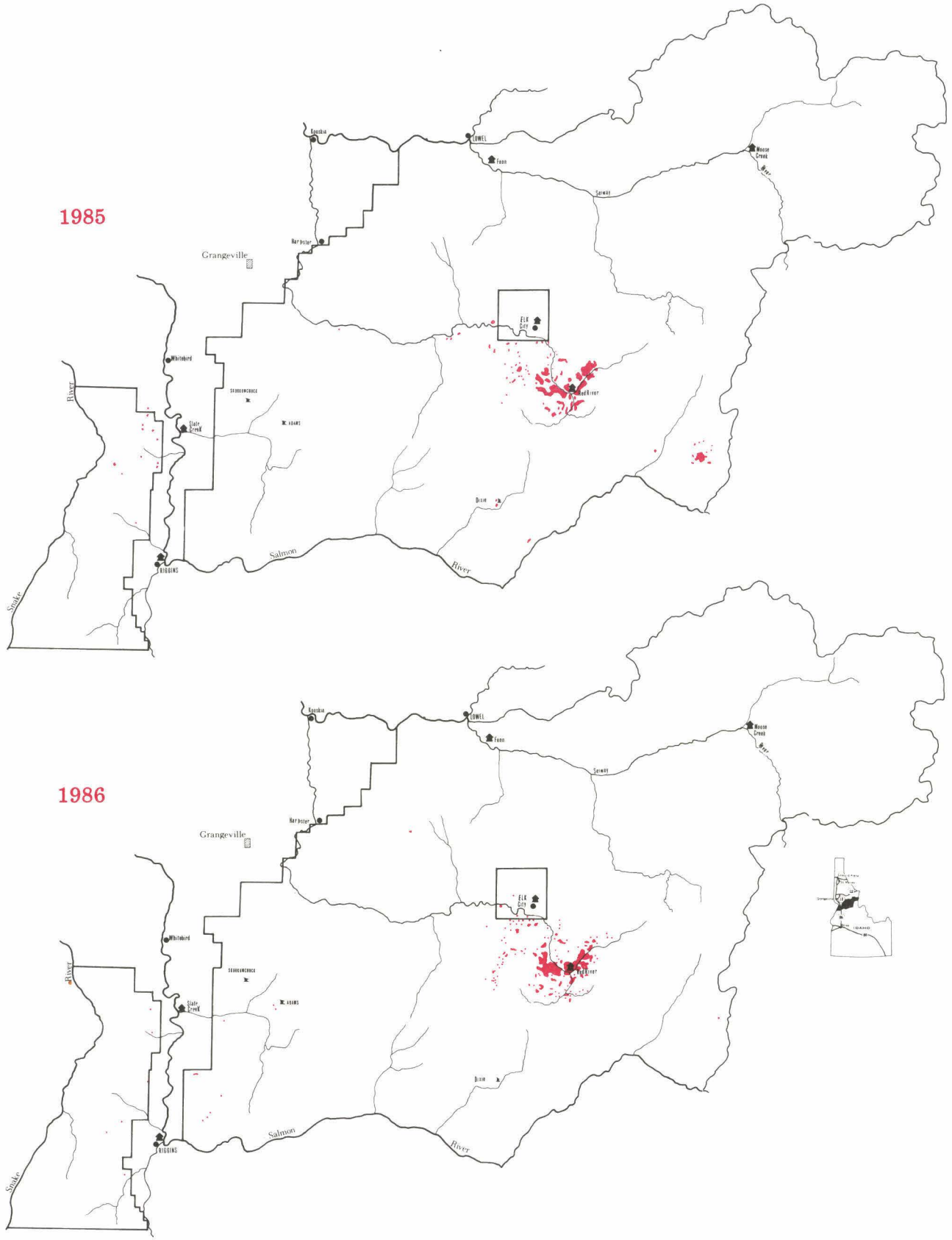


Figure 14.--Areas of pines infested by mountain pine beetle, Nezperce National Forest area, Idaho.

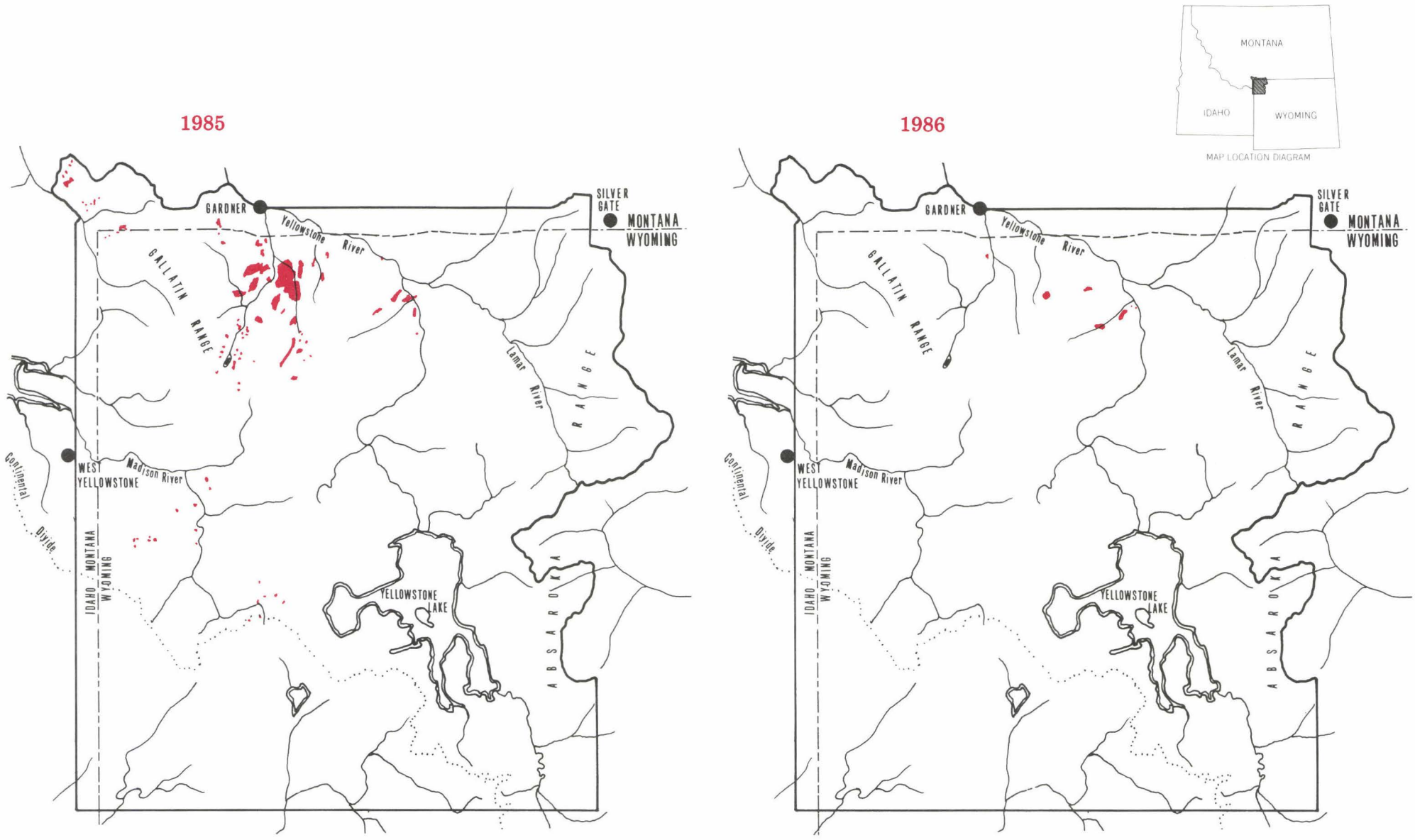


Figure 16.--Areas of pines infested by mountain pine beetle, Yellowstone National Park, Wyoming.

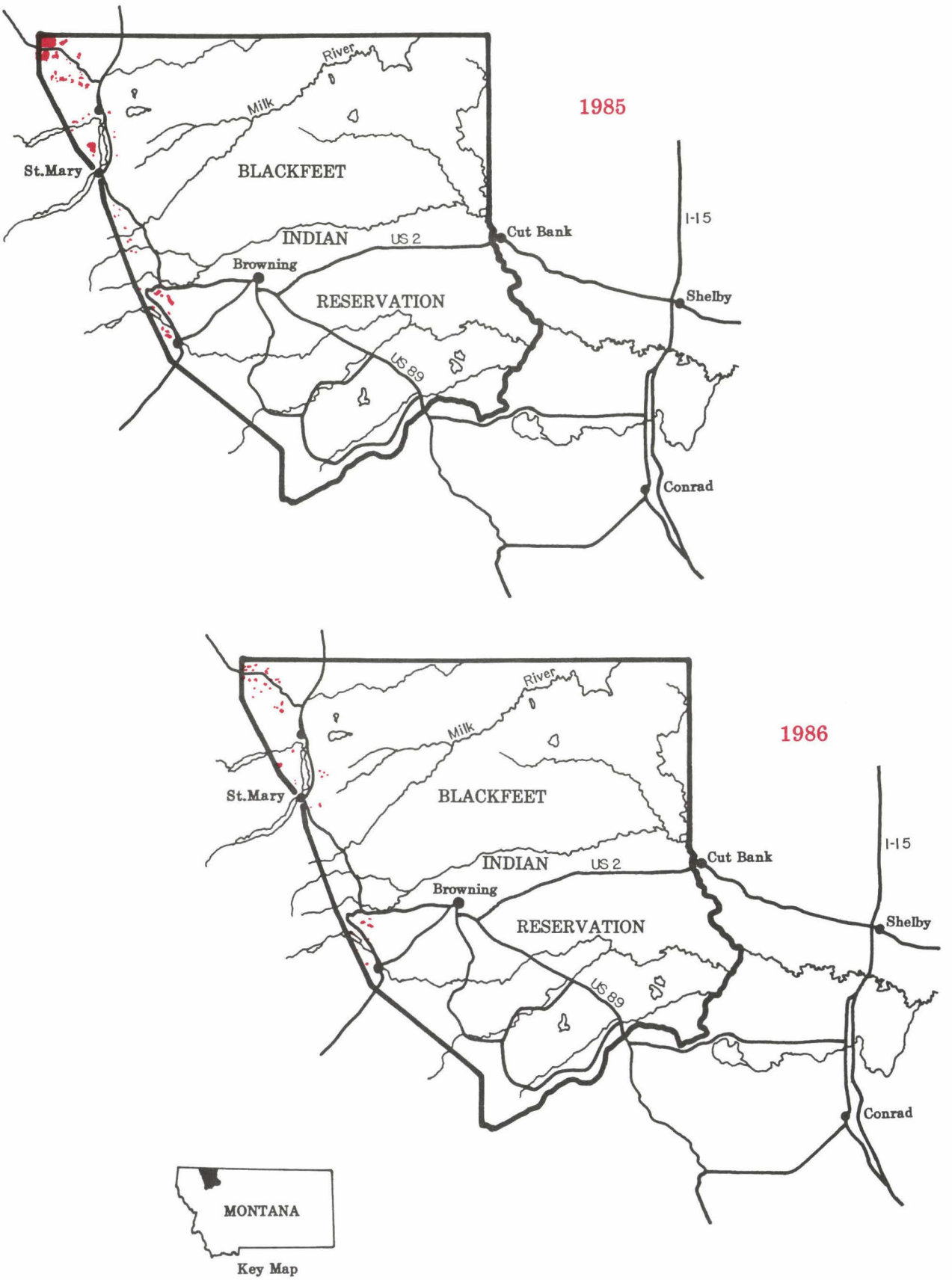


Figure 17.--Areas of pines infested by mountain pine beetle, Blackfeet Indian Reservation, Montana.

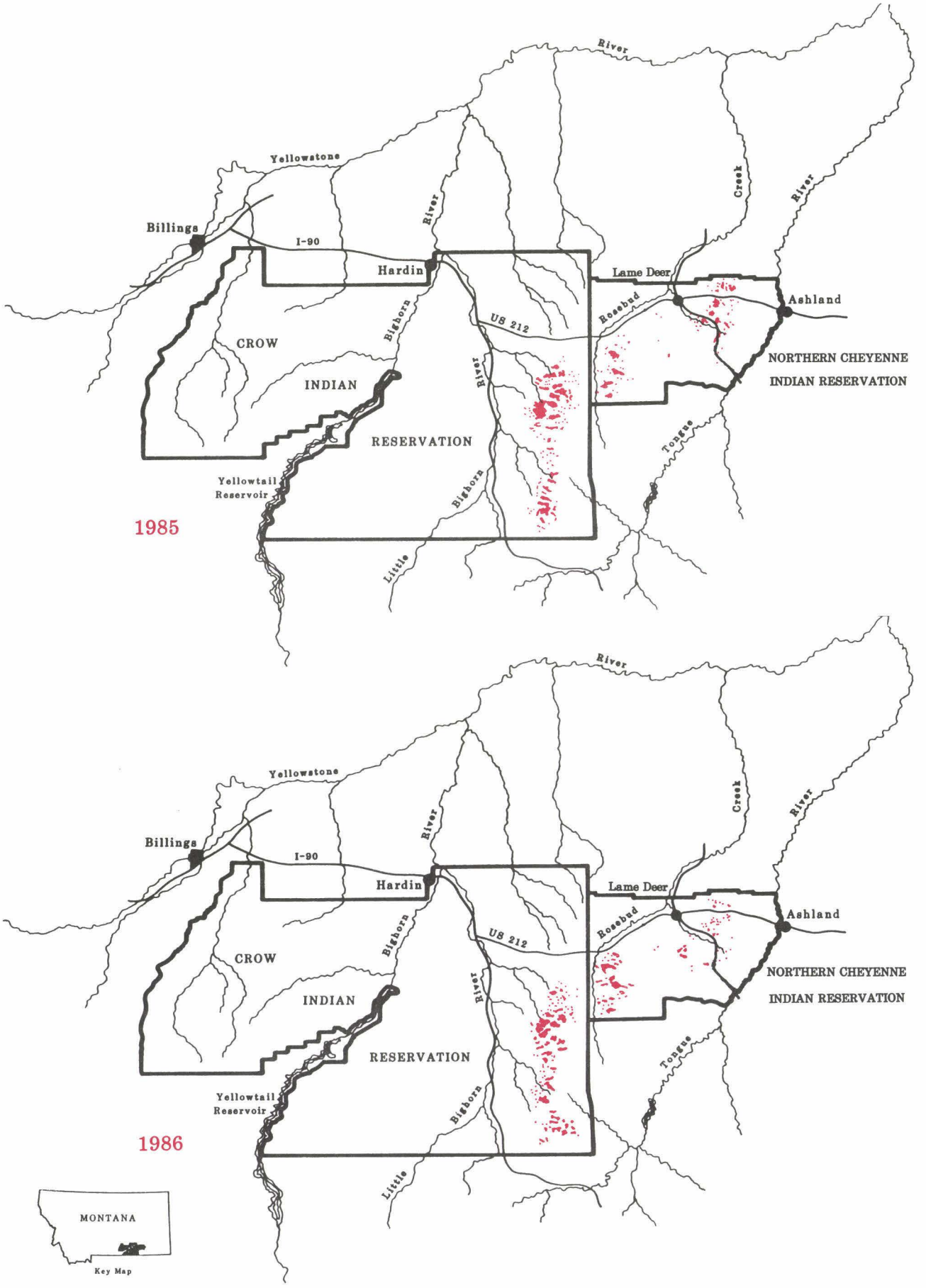


Figure 18.--Areas of pines infested by mountain pine beetle, Crow & Northern Cheyenne Indian Reservations, Montana.

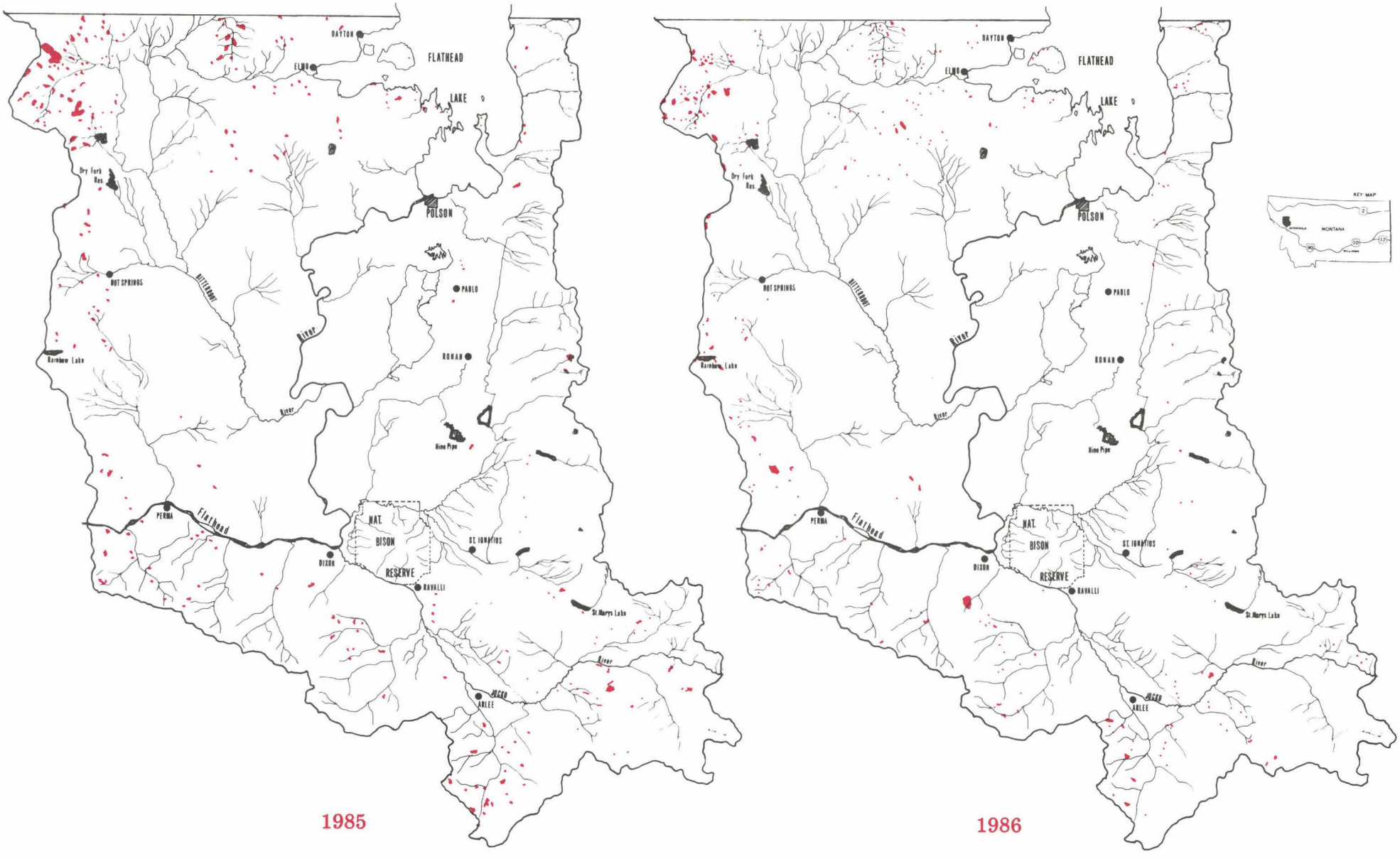


Figure 19.--Areas of pines infested by mountain pine beetle, Flathead Indian Reservation, Montana.

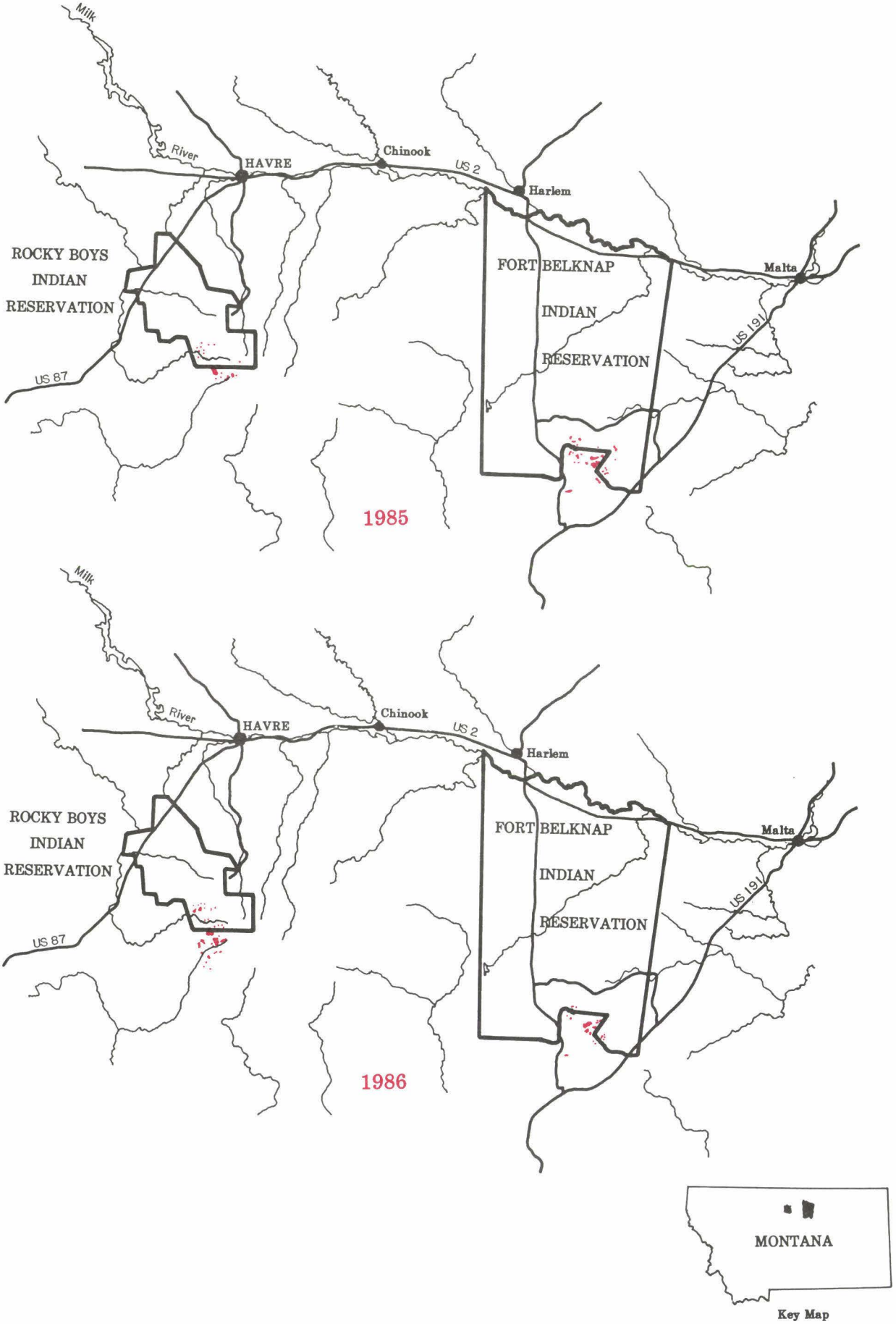


Figure 20.--Areas of pines infested by mountain pine beetle, Bureau of Land Management, and Fort Belknap & Rocky Boys Indian Reservations, Montana.